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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/811,993	KIM ET AL.
Office Action Summary	Examiner	Art Unit	
	Trang U. Tran	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _20 June 2008_.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under _Ex parte Quayle_, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-34_ is/are pending in the application.

    4a) Of the above claim(s) _24-31_ is/are withdrawn from consideration.

5) ☒ Claim(s) _32-34_ is/are allowed.

6) ☒ Claim(s) _1-4,6,8-21 and 23_ is/are rejected.

7) ☒ Claim(s) _5,7 and 22_ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments filed June 20, 2008 have been fully considered but they are not persuasive.

In re pages 16-17, applicant argues, with respect to claim 1, that Kim does not disclose or fairly suggest "generating at least one scan line of including spatio-temporal pixel values, each spatio-temporal pixel value being a combination of a spatially interpolated pixel value and a temporally interpolated pixel value" as required by claim 1 because, contrary to the method of claim 1, in the conversion device of Kim, the selector 140 selects one of a spatially interpolated signal Is or a temporally interpolated signal It based on a comparison between motion correlation DM, vertical correlation DV and temporal-vertical correlation DT with predetermined constants and no combing of these separately interpolated signals or spatial and temporal pixel values is performed.

In response, as discussed in the last Office Action, the examiner respectfully disagrees. As recognized by applicants, the selector 140 of Kim selects one of a spatially interpolated signal IS or a temporally interpolated signal IT based on a comparison between motion correlation DM, vertical correlation DV and temporal-vertical correlation DT with predetermined constants. It is noted that the claimed "combination" can be anticipated by the selection 140 of Kim because the selector 140 combines the outputs of the spatial interpolator 110 and the temporal interpolator 120. It is further noted that the time-divisional multiplexer using switch to combine inputted signals. Each spatio-temporal pixel value is a combination of a spatially interpolated

pixel value and a temporally interpolated pixel value; for example, the combination of zero and spatially interpolated pixel value and the combination of zero and temporally interpolated pixel value. Thus, Kim indeed does disclose the claimed "generating at least one scan line of including spatio-temporal pixel values, each spatio-temporal pixel value being a combination of a spatially interpolated pixel value and a temporally interpolated pixel value" as required by claim 1.

In re page 17, applicant argues that claim 8 is patentable over Kim or at least reasons somewhat similar to those set forth above with regard to claim 1.

In response, the examiner respectfully disagrees. As discussed above with respect to claim 1, Kim discloses all the claimed limitations of claim 1.

In re pages 18-19, applicant argues that nowhere does Kim disclose or suggest that the spatially interpolated signal Is and the temporally interpolated signal It are combined in anyway and Kim does not disclose or fairly suggest combining the spatially interpolated signal Is and the temporally interpolated signal It on a per pixel value basis to generate a spatio-temporal pixel value.

In response, the examiner respectfully disagrees. As discussed above with respect to claim 1, Kim does indeed disclose the claimed that the spatially interpolated signal Is and the temporally interpolated signal It are combined and combining the spatially interpolated signal Is and the temporally interpolated signal It on a per pixel value basis to generate a spatio-temporal pixel value.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

        This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

3.   Claims 1-4, 6, 8-21 and 23 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kim (US Patent No. 5,943,099).

        In considering claim 1, Kim discloses all the claimed subject matter, note 1) the

claimed performing one of at least two interlaced-to-progressive conversion (IPC)

techniques on input interlaced scan data is met by the spatial interpolator 110 and the

temporal interpolator 120 (Fig. 1, col. 3, line 48 to col. 4, line 21), and 2) the claimed

one of the at least two IPC techniques generating at least one scan line of including

spatio-temporal pixel values, each spatio-temporal pixel value being a combination of a

spatially interpolated pixel value and a temporally interpolated pixel value is met by the

selector 140 which selects a signal Is output based on basis of the compared results as an interpolated signal Vout (Fig. 1, col. 3, line 48 to col. 4, line 21 and col. 6, line 50 to col. 7, line 32) except for providing the newly added limitation that the performing step is selectively based on a received control command.

Kim also teaches in the Related Art that, recently, the interlaced-to-progressive conversion apparatus has become more important since a high definition (resolution) television (HDTV) system adopts a plurality of standards on signal formats and the conversion among stand input/output signals of various formats is required frequently (see col. 1, lines 21-26).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the conversion among standard input/output signals of various formats as taught in Kim's Related Art into Kim's system in order to display different video signals having different format on different television receivers.

In considering claim 2, the claimed wherein the control command indicates to perform one of at least a spatial interpolation IPC technique and a spatial/temporal interpolation IPC technique is met by the selector 140 which selects a signal Is output based on basis of the compared results as an interpolated signal Vout (Fig. 1, col. 3, line 48 to col. 4, line 21 and col. 6, line 50 to col. 7, line 32).

In considering claim 3, Kim discloses all the claimed subject matter, note 1) the claimed wherein the spatial interpolation IPC technique performs spatial interpolation on a current field of the input interlaced scan data to produce a field of complementary scan data that together with the current field represents a frame of progressive scan

data is met by the spatial interpolator 110 which is simple line doubling (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21),.and 2) the claimed the spatial/temporal interpolation IPC technique performs directionally adaptive spatial interpolation selectively combined with temporal interpolation using the current field, at least one previous field and at least one subsequent field of the input interlaced scan data to produce a field of complementary scan data that together with the current field represents a frame of progressive scan data is met by the temporal interpolator 120 which is edge direction (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 4, the claimed wherein the spatial/temporal interpolation IPC technique is adaptive is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 6, the claimed wherein the control command indicates to perform one of at least a spatial interpolation IPC technique, an alternative field output IPC technique in which two consecutive fields of the input interlaced scan data are alternately output on a scan line by scan line basis to produce a frame of progressive scan data, and a spatial/temporal interpolation IPC technique is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

Claim 8 is rejected for the same reason as discussed in claim 1.

Claim 9 is rejected for the same reason as discussed in claim 2.

Claims 10-11 are rejected for the same reason as discussed in claims 3-4, respectively.

Claim 12 is rejected for the same reason as discussed in claim 6.

In considering claim 13, the claimed wherein the conversion structure comprises: an interpolator configured to interpolate lines of a frame of progressive scan data missing from a current field of the input interlaced scan data by spatially interpolating the missing lines using the current field is met by the spatial interpolator 110 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 14, the claimed wherein the conversion structure is configured to supply the selector with the input interlaced scan data of a current field and one of a preceding and following field of the input interlaced scan data is met by the selector 140 which selects a signal Is output based on basis of the compared results as an interpolated signal Vout (Fig. 1, col. 3, line 48 to col. 4, line 21 and col. 6, line 50 to col. 7, line 32).

In considering claim 15, the claimed wherein the conversion structure comprises: a spatial/temporal interpolator configured to perform a spatial/temporal interpolation IPC conversion technique on the input interlaced scan data to produce a portion of the progressive scan data is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 16, the claimed wherein the spatial/temporal interpolator is configured to perform adaptive spatial/temporal interpolation is met by the spatial

interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 17, the claimed wherein the spatial/temporal interpolator is configured to perform directionally adaptive spatial interpolation is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 18, the claimed wherein the spatial/temporal interpolator is configured to directionally adapt the spatial interpolation based on a measure of a difference between pixels neighboring a pixel being interpolated is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 19, the claimed wherein the spatial/temporal interpolator is configured to adapt the spatial/temporal interpolation based on a complexity of an image is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

In considering claim 20, the claimed wherein the spatial/temporal interpolator is configured to adapt the spatial/temporal interpolation to reduce an influence of the temporal interpolation as a change in an image over time increases is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21).

Claim 21 is rejected for the same reason as discussed in claim 3 and further the claimed the selector is configured to receive output of the interpolator, and output of the spatial/temporal interpolator.

Claim 23 is rejected for the same reason as discussed in claim 7.

Allowable Subject Matter

4.   Claims 32-34 are allowed.

5.   Claims 5, 7 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang U. Tran whose telephone number is (571) 272-7358. The examiner can normally be reached on 9:00 AM - 6:30 PM, Monday to Friday.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N. Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

        Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

September 30, 2008   /Trang U. Tran/
                                               Primary Examiner, Art Unit 2622